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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/844,752	04/27/2001	Bin Yu	P1316	2099

7590                  01/28/2003

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[REDACTED] EXAMINER

POMPEY, RON EVERETT

[REDACTED] ART UNIT      [REDACTED] PAPER NUMBER

2812

DATE MAILED: 01/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/844,752	YU, BIN	
	<b>Examiner</b>	<b>Art Unit</b>	
	Ron E Pompey	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 11-13-02.
- 2a) This action is **FINAL**.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) \_\_\_\_\_ is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a)  The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                              | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)          | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____.                                   |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-6 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (5,595,919) in further view of Wu (US 6,190,977).

Pan discloses the steps of :

For claims 1-6 and 9-11:

providing a gate oxide and gate;  
performing a source/drain extension implant (30, fig. 9);  
forming spacer on the gate (22, fig. 3)  
removing the spacer (fig. 7); and  
performing a halo implant (34, fig. 11) (col. 2, ln. 59 – col. 3, ln. 54).

3. Pan discloses the claimed invention except for the limitations disclosed below by Wu.

For claims 1-6 and 8-11:

the gate defining a channel region of no more than 50 nm length (col. 1, lns. 54-67);  
performing epitaxy to form raised source/drain regions (26, fig. 5); and

forming a silicide (32 a,b, fig. 7) on the gate and source/drain regions (col. 5, Ins. 50 – 56 and col. 6, Ins. 14-37).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Wu with Pan, because the raised source and drain suppresses the short channel effect and protects the substrate from further processing steps.

4. Pan and Wu disclose the claimed invention except for the implant depth of either the source/drain extension or the halo. However it would have been obvious to one of ordinary skill in the art at the time the invention was made to implant the dopants at the claimed ranges of depth, for claims 2, 4, 5, 9 and 10, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art.

#### ***Response to Arguments***

5. Applicant's arguments filed 11-13-02 have been fully considered but they are not persuasive. The applicant argues that Pan teaches away from halo implantation of similar conductivity and that Wu teaches away from halo implantation all together. However, Pan teaches away from halo implantation according the conventional method, "...which increases the well concentration at the junction boundary, which increases the junction capacitance. Instead of forming the halo only in the small critical region so that junction capacitance and circuit speed are not effected." ( column 1, Ins. 33-39), like the claimed invention. Pan does not disclose a halo implantation of the same conductivity type, but the claimed invention does not limit the scope of the invention for implantation

of the halo to the same conductivity as the LDD junctions. For example claim 2, discloses P<sup>+</sup> for the source/drain extensions and claim 4 discloses B<sup>+</sup> for the halo, therefore the selected group of dopants are a subset of each disclosed set of dopants and therefore do not preclude the examiner to have the same dopant conductivity. Also, Wu is used to show that a raised source and drain can be used also to protect the substrate from further processing steps (for example mask from subsequent implantation steps), similar to the thick oxide layer 26 in the Pan reference.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (703) 305-3016. The examiner can normally be reached on flex schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Ron Pompey  
Ron Pompey  
Art Unit: 2812  
January 24, 2003

  
John F. Niebling  
Supervisory Patent Examiner  
Technology Center 2890